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EXAMINER
YAM, STEPHEN K

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2878	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/825,273	ENGELHARDT ET AL.
	Examiner	Art Unit
	Stephen Yam	2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 October 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22 and 24-41* is/are rejected.

7)☒ Claim(s) *23* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

This action is in response to Amendments and remarks filed on October 25, 2002. Claims 1-41 are currently pending.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 3 and 18 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 3 recites the broad recitation "polarization beam

splitter", and the claim also recites "Glan-Thompson prism" which is the narrower statement of the range/limitation.

Regarding Claim 18, the limitation "several laser light sources" is indefinite- it is unclear how the laser light sources are attached to the invention and affect the usage of the device. An explanation of the usage of the laser light sources towards the apparatus should be described, including the usage of the cascaded output light and the method of cascading the light beams.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in-
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Arimoto et al. US Patent No. 5,233,188.

Regarding Claim 1, Arimoto et al. teach an apparatus comprising two laser sources (51p and 51s) (see Fig. 1) each defining a light beam wherein the light from the laser light sources has approximately the same wavelength (see Col. 2, lines 45-48), and a beam combining unit (3) which combines the light beams lossless, wherein the combination of the light beam is

accomplished with reference to at least one characteristic property of the light beams (see Col. 4, lines 40-42).

Regarding Claims 2 and 4, the laser sources are orthogonally polarized (see Col. 4, lines 38-42) before being combined by the beam combining unit.

Regarding Claim 3, a polarization beam splitter (3) (see Col. 4, lines 40-42) is provided as the beam combining unit.

Regarding Claim 5, Fig. 1 shows the light from a first light source (51s) deflected by the polarization beam splitter (3) while the light from a second light source (51p) passes through the polarization beam splitter (3).

3. Claims 1 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Suganuma US Patent No. 6,249,381.

Suganuma teaches an apparatus with a first light source (32b) (see Fig. 11), a second light source (32a), and a beam combining means (35) to combine the light from the laser light sources, where the light of the first light source is cascaded with the light of the second light source. Although Suganuma does not specifically mention the two light sources having the same wavelength, it is inherent that each of the laser light sources emits light of the same wavelength, as the purpose of the apparatus is to create a single light beam of high intensity, only possible through constructive interference with light of identical wavelength.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 6-9 and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto et al. in view of Kondo US Patent No. 4,902,888.

Regarding Claims 6 and 7, Arimoto et al. teach an apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams. Arimoto et al. do not teach a Faraday rotator arranged between the two light beams. Kondo teaches an apparatus with a Faraday rotator (14) (see Fig. 1) and a polarization beam splitter (46) to rotate the polarity of two light beams (see Col. 8, lines 21-30). Regarding Claim 6, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Arimoto et al. with a Faraday rotator to rotate the polarization of the light beams, to combine the two light beams into a single beam, as taught by Kondo. Regarding Claim 7, it would have been obvious to one of ordinary skill in the art at the time the invention was made to set the polarization directions of the light beams from the first and second light sources to be parallel with each other in the modified apparatus of Arimoto in view of Kondo, so that the two light beams constructively interfere to provide an output light beam with the maximal possible intensity.

Regarding Claims 8 and 9, Arimoto et al. teach an apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams. Arimoto et al. do not teach a Y-coupler to combine two light beams. Kondo teaches a Y-coupler

(396) to combine light beams from two fibers (328, 334). It is common knowledge that a Y-coupler contains a non-continuous fiber and a continuous fiber. Regarding Claim 8, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the Y-coupler of Kondo for the beam combining unit of Arimoto et al., to effectively combine the light beams from the two sources without any significant loss. Regarding Claim 9, it would have been obvious to one of ordinary skill in the art at the time the invention was made to set the polarization direction of the light from the one laser light source to couple the light from the non-continuous fiber to the continuous fiber of the fiber Y-coupler, and to set the polarization direction of the light from the other laser light source so it remains in the continuous fiber, in the modified apparatus of Arimoto et al. in view of Kondo, as the purpose of the fiber Y-coupler is to combine the two light sources, which can only be accomplished if the two light polarizations are correctly set.

Regarding Claim 12, Arimoto et al. teach an apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams. Arimoto et al. do not teach a pulsed laser light source. Kondo teaches an apparatus with a pulsed laser light source (see Col. 15, lines 30-31), and it is inherent that a pulsed laser light source contains a pulse profile over time, and synchronization of pulses can be used to provide constructive interference to increase light intensity. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the laser light source in the apparatus of Arimoto et al. to emit pulses as taught by Kondo, as a form of providing increased light intensity.

Regarding Claim 13 and 15, Arimoto et al. teach an apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams.

Arimoto et al. do not teach a beam combining unit as an acousto-optical deflector or as an electro-optical deflector. Kondo teaches an apparatus with an acousto-optical deflector (396) (see Col. 28, lines 28-29). Regarding Claim 13, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the acousto-optical deflector of Kondo in the apparatus of Arimoto et al., to join two pulsed light beams, as described by Kondo (see Col. 28, lines 37-39). Regarding Claim 15, it would have been obvious to one of ordinary skill in the art at the time the invention was made to deflect individual light pulses in the modified device of Arimoto et al. in view of Kondo, to provide control to vary the intensity of the output light beam at different time periods.

Regarding Claim 14, Arimoto et al. teach an apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams. Arimoto et al. do not teach the pulses of the laser light sources offset in time with respect to one another. Kondo teaches an apparatus with a pulsed laser light source (see Col. 15, lines 30-31), with two light beams offset in time with one another (see Col. 26, lines 34-35). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use time-offset pulsed laser light sources of Kondo in the apparatus of Arimoto et al., to create interference effects to affect the intensity of the output light beam.

6. Claims 1, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ullmann et al.

Regarding Claims 1 and 16, Ullmann et al. teaches an apparatus with at least two laser light sources (1a) each defining a light beam (S1, S2, S3) and a beam combining unit (9) defined

by a numerical aperture of a glass fiber (see Col. 6, lines 25-29). Ullman et al. do not teach the two light sources having the same wavelength. It would have been obvious to one of ordinary skill in the art at the time the invention was made for each of the laser light sources to emit light of the same wavelength, as the purpose of the apparatus is to create a single light beam of high intensity, only possible through constructive interference with light of identical wavelength.

Regarding Claim 17, Ullmann et al. teach an apparatus with at least two laser light sources, and a numerical aperture of a glass fiber as a beam combining unit. Ullmann et al. do not teach the glass fiber being a single-mode fiber. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a single-mode fiber for a beam combining unit of Ullmann et al., to effectively transmit a single high-intensity beam of output light by utilizing the low-dispersion properties of a single-mode fiber.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto et al. in view of Hino US Patent No. 5,051,575.

Arimoto et al. teach an apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams. Arimoto et al. do not teach a double-refracting optical element provided as the beam combining unit. Hino teaches an apparatus with two light beams having orthogonal planes of polarization (see Col. 5, lines 8-11) and a double-refracting optical element (76) used as a beam combining unit. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the double-refracting optical element of Hino in the apparatus of Arimoto et al., as a method of combining two beams of light, as taught by Hiro (see Col. 8, lines 46-48).

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto et al. in view of Hino as applied to claim 10 above, and further in view of Sato et al. US Patent No. 5,132,950.

Arimoto et al. teach an apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams. Arimoto et al. do not teach a double-refracting optical element provided as the beam combining unit. Hino teaches an apparatus with two light beams having orthogonal planes of polarization (see Col. 5, lines 8-11) and a double-refracting optical element (76) used as a beam combining unit. Arimoto et al. in view of Hino do not teach the polarization direction of the light from the first laser light source set to conform to that of the extraordinary beam of the beam combining unit, and the polarization direction of the light from the second laser light source set to conform to that of the ordinary beam of the beam combining unit. Sato et al. teach a double-refracting optical element (1) (see Fig. 1) with an extraordinary beam and an ordinary beam (Col. 6, line 69 to Col. 7, line 5) having orthogonal planes of polarization (see Col. 2, lines 65-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the first laser light source to correspond to the extraordinary beam and the second laser light source to correspond to the ordinary beam in the double-refracting optical element in the modified apparatus of Arimoto et al. in view of Hino, as both laser light sources combine to contribute an extraordinary beam and an ordinary beam to the double-refracting element, and it is common knowledge that only the proper polarization of each of the beams, where one beam corresponds to the extraordinary beam and the other beam

corresponds to the ordinary beam, will result in constructive interference to create an output beam of greatest intensity.

9. Claims 19-22 and 24-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suganuma.

Regarding Claims 19-22, Suganuma teaches an apparatus with a first light source (32b) (see Fig. 11), a second light source (32a), and a beam combining means (35) to combine the light from the laser light sources, where the light of the first light source is cascaded with the light of the second light source. Suganuma also teaches the combined light from the two light laser light sources coupled into a glass fiber (37). Regarding Claim 21, Suganuma further teaches the glass fiber (37 on Fig. 11, 37a on Fig. 12) combined with at least one further light beam (37b and 37c) (see Fig. 12). Regarding Claim 22, it is inherent that several polarizing fiber Y-couplers are used to combine the three optical fibers (37a, 37b, 37c) into a single beam. Suganuma does not teach the glass fiber to be polarizing, wherein light in any desired polarization state is linearly polarized. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide polarizing properties to the glass fiber of Suganuma, to enforce the polarity of output light for further coupling.

Regarding Claim 24, Suganuma teaches an apparatus with a first light source (32b) (see Fig. 11), means for dividing the light from the first light source into a plurality of partial beams (33a), a light source (32a) wherein the light of each partial beam is coupled into the laser light sources, and a beam combining means (35) to combine the light from the laser light sources. Suganuma also teaches an apparatus with a plurality of laser light sources (25a, 25b, 25c) and a

plurality of beam combining means (26a, 26b, 26c leading to 27a) to combine the light emitted from the laser light sources. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a plurality of laser light sources and beam combining means in the first apparatus of Suganuma, to further increase the intensity of the output light.

Regarding Claims 25, 26, and 29, it would have been obvious to one of ordinary skill in the art at the time the invention was made to examine the phase of the light beams for combining the light, perform beam combination in accordance with the time reversal of a beam division in the modified device of Suganuma, or provide phase-modification means for each laser light source to match the phase of each light source, as it is well known in the art that the combining light beams must have a synchronized wavelength, polarization, and phase to maximally constructively combine the light energy for increased intensity.

Regarding Claim 27, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include an optical diode in the modified device of Suganuma, to prevent feedback of light.

Regarding Claim 28, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a Faraday rotator, a Faraday rotator in conjunction with a Glan-Thompson prism, an acousto-optical modulator, or an optical circulator as an optical diode for a light source in the modified device of Suganuma, as such devices are well known in the art as having abilities to restrict light emitted in a specific direction.

10. Claims 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura US Patent No. 5,168,157.

Regarding Claims 30-31, Kimura teaches a confocal scanning microscope with a light source (see Col. 3, line 54), two light beams orthogonally polarized to each other (see Col. 3, lines 54-59 and Col. 4, lines 12-19), and a beam combining means (see Col. 8, lines 24-26). Kimura does not teach two light sources with orthogonally-polarized light beams. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use two separate light sources to generate two separate light sources to generate the two orthogonally-polarized light beams in the microscope of Kimura, to increase the total intensity of light.

11. Claims 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura in view of Arimoto et al.

Regarding Claims 32 and 33, Kimura teaches a confocal scanning microscope with a beam combining unit to combine two orthogonally-polarized light beams. Kimura also teaches a polarization beam splitter to split light into two orthogonally-polarized light beams. Kimura does not teach a polarization beam splitter to combine two light beams. Arimoto et al. teaches a polarization beam splitter to combine two orthogonally-polarized light sources into a single light beam. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the polarization beam splitter of Arimoto et al. in the microscope of Kimura to combine the two orthogonally-polarized light beams, as it is well known in the art that polarization beam splitter can be used to both split and combine light, as taught by Arimoto et al.

Regarding Claim 34, Kimura teaches a confocal scanning microscope with a beam combining unit to combine two orthogonally-polarized light beams. Kimura also teaches a

polarization beam splitter to split light into two orthogonally-polarized light beams. Kimura does not teach a polarization beam splitter to combine two light beams. Arimoto et al. teaches a polarization beam splitter to combine two orthogonally-polarized light sources into a single light beam. Arimoto et al. also teaches light from a first light source (51s) (see Fig. 1) deflected by the polarization beam splitter (3) while the light from a second light source (51p) passes through the polarization beam splitter (3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the polarization beam splitter of Arimoto et al. in the microscope of Kimura to combine the two orthogonally-polarized light beams such that the polarization direction of one light source deflects through the polarization beam splitter and the polarization direction of a second light source passes through the polarization beam splitter, to maximize the amount of combined light.

12. Claims 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura in view of Kondo.

It is assumed that the inventor intended to produce Claims 35 and 36 as dependent from Claim 30. Kimura teaches a confocal scanning microscope with a beam combining unit to combine two orthogonally-polarized light beams. Kimura does not teach a Y-coupler as a beam combining unit. Kondo teaches a Y-coupler (396) to combine light beams from two fibers (328, 334). It is common knowledge that a Y-coupler contains a non-continuous fiber and a continuous fiber. Regarding Claim 35, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the Y-coupler of Kondo for the beam combining unit of Kimura, to effectively combine the light beams from the two sources without any

significant loss. Regarding Claim 36, it would have been obvious to one of ordinary skill in the art at the time the invention was made to set the polarization direction of the light from the one laser light source to couple the light from the non-continuous fiber to the continuous fiber of the fiber Y-coupler, and to set the polarization direction of the light from the other laser light source so it remains in the continuous fiber, in the modified microscope of Kimura in view of Kondo, as the purpose of the fiber Y-coupler is to combine the two light sources, which can only be accomplished if the two light polarizations are correctly set.

13. Claims 37-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura in view of Saganuma.

Regarding Claim 37, Kimura teaches a confocal scanning microscope with a light source (see Col. 3, line 54), two light beams orthogonally polarized to each other (see Col. 3, lines 54-59 and Col. 4, lines 12-19), and a beam combining means (see Col. 8, lines 24-26). Kimura does not teach a cascaded beam combination of several laser light sources. Suganuma teaches an apparatus with a first light source (32b) (see Fig. 11), a second light source (32a), and a beam combining means (35) to combine the light from the laser light sources, where the light of the first light source is cascaded with the light of the second light source. Although Suganuma does not specifically mention the two light sources having the same wavelength, it is inherent that each of the laser light sources emits light of the same wavelength, as the purpose of the apparatus is to create a single light beam of high intensity, only possible through constructive interference with light of identical wavelength. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the cascaded beam combination of several

laser light sources taught by Saganuma in the confocal scanning microscope of Kimura, to further increase the intensity of light through successive cascading.

Regarding Claims 38-41, Kimura teaches a confocal scanning microscope with a light source (see Col. 3, line 54), two light beams orthogonally polarized to each other (see Col. 3, lines 54-59 and Col. 4, lines 12-19), and a beam combining means (see Col. 8, lines 24-26). Kimura does not teach a cascaded beam combination of several laser light sources. Suganuma teaches an apparatus with a first light source (32b) (see Fig. 11), a second light source (32a), and a beam combining means (35) to combine the light from the laser light sources, where the light of the first light source is cascaded with the light of the second light source. Suganuma also teaches the combined light from the two light laser light sources coupled into a glass fiber (37). Regarding Claim 40, Suganuma further teaches the glass fiber (37 on Fig. 11, 37a on Fig. 12) combined with at least one further light beam (37b and 37c) (see Fig. 12). Regarding Claim 41, it is inherent that several polarizing fiber Y-couplers are used to combine the three optical fibers (37a, 37b, 37c) into a single beam. Suganuma does not teach the glass fiber to be polarizing, wherein light in any desired polarization state is linearly polarized. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide polarizing properties to the glass fiber of Suganuma to enforce the polarity of output light for further coupling, to incorporate the cascaded beam combination of several laser light sources taught by Saganuma in the confocal scanning microscope of Kimura, to further increase the intensity of light through successive cascading.

Allowable Subject Matter

14. Claims 11 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. The following is a statement of reasons for the indication of allowable subject matter:

Regarding Claim 11, an apparatus with polarizing prism to combine two light beams from two light sources where one light beam is an extraordinary beam and the other light beam is an ordinary beam, is not disclosed or made obvious by the prior art of record.

Regarding Claim 23, an apparatus with three laser light sources and two Faraday rotators and two polarization beam splitters, is not disclosed or made obvious by the prior art of record.

Response to Arguments

16. Applicant's arguments filed October 25, 2002 have been fully considered but they are not persuasive.

Regarding the 35 U.S.C. 112 2nd paragraph rejection of Claim 18, Examiner maintains that it is unclear how the "several laser light sources" relate to the remainder of the invention and if they are related to the "at least two laser light sources" from parent Claim 1.

Regarding the 35 U.S.C. 102(b) rejection of Claims 1-5 over Arimoto, Applicant argues that Arimoto does not teach the largely lossless combination of laser light as taught in Claim 1. Examiner asserts that a polarization prism inherently possesses the properties of lossless combination, and directs Applicant to Tokano et al. US Patent No. 5,850,140 for reference, who teach that a polarization prism is "advantageous in that optical energy loss is considerably suppressed" (see Col. 6, lines 25-29). Examiner maintains Arimoto indeed teaches the first light

beam (S-polarized) deflected by the polarization prism while the second light beam (P-polarized) passes through the polarization prism (see Col. 1, lines 32-47). Regarding Claim 3, Examiner maintains that the claim language contains a broad limitation followed by a narrow limitation, which causes the limitation of the claim to become indefinite (see 35 U.S.C. 112 2nd paragraph rejection of Claim 3 above). Regarding Claim 5, Applicant argues that Arimoto teaches that two laser beams are combined through a polarization prism, while the claim language recites a first laser light source deflected by the polarization prism while a second laser light source passes through the polarization prism. Hence, the rejection of Claims 1, 2, 4, and 5 under 35 U.S.C. 102(b) over Arimoto is maintained.

Regarding the 35 U.S.C. 102(e) rejection of Claims 1 and 18 over Suganuma, Applicant argues that Suganuma does not teach the largely lossless combination of laser light as taught in Claim 1. Examiner asserts that a polarization prism inherently possesses the properties of lossless combination, and once again, directs Applicant to Tokano et al. US Patent No. 5,850,140 for reference, who teach that a polarization prism is "advantageous in that optical energy loss is considerably suppressed" (see Col. 6, lines 25-29). Hence, the rejection of Claims 1 and 18 under 35 U.S.C. 102(e) over Arimoto is maintained.

Regarding the 35 U.S.C. 103(a) rejection of Claims 6 and 7 over Arimoto in view of Kondo, Applicant argues that Arimoto and Kondo do not teach a polarization beam splitter and a faraday rotator to rotate the polarity of two light beams from two laser sources. Examiner notes that the incorrect reference number of 14 for the faraday rotator was used in the prior Office Action to indicate the faraday rotator, whereas the correct reference number should be 44, as consistent with Examiner's reference in the prior Office Action towards Col. 8, lines 21-30.

Examiner also asserts that Kondo teaches the faraday rotator as arranged between two light beams (reference/measuring beams incident on prisms 52,54 as in Fig. 3 and reference/measuring beams reflected off prisms 52,54 as in Fig. 4) wherein the light beams are proceeding in opposite directions (towards prisms 52,54 in Fig. 3 and away from 52,54 in Fig. 4). Examiner also maintains that Arimoto teaches using two light sources to provide two light beams. Hence, all the limitations of the claims are provided through either Arimoto or Kondo. Therefore, Claims 6 and 7 remains obvious under 35 U.S.C. 103(a) over Arimoto in view of Kondo.

Regarding the 35 U.S.C. 103(a) rejection of Claims 8, 9, 12-15 over Arimoto in view of Kondo, since Examiner maintains that Claim 1 is anticipated over Arimoto, the rejection of Claims 8 and 9 are also maintained.

Regarding the 35 U.S.C. 103(a) rejection of Claim 10 over Arimoto in view of Hino, since Examiner maintains that Claim 1 is anticipated over Arimoto, the rejection of Claim 10 is also maintained.

Regarding the 35 U.S.C. 103(a) rejection of Claim 11 over Arimoto in view of Hino, Applicant argues that the light beams are diverged in the teachings of Hino. Examiner asserts that the Hino reference was used to demonstrate the use of "extraordinary" and "ordinary" beam in reference to a polarization beam-splitting prism, and notes for further support the web link: http://www.phys.ksu.edu/perg/vqm/laserweb/Ch-7/C7s5t5p1.htm (copy included herein) which further defines an extraordinary beam as the deflected beam in a prism and the ordinary beam as the beam which passes through the prism. As already shown from the response to Claim 1, Arimoto teaches one beam deflected off the prism and the other

beam passing through the prism, both combined to form a single beam. Hence, Examiner maintains that Claim 11 remains obvious under 35 U.S.C. 103(a) over Arimoto in view of Hino.

Regarding the 35 U.S.C. 103(a) rejection of Claims 16 and 17 over Ullmann et al., Applicant argues that Ullmann et al. do not teach losslessly combining the light beams and combining with reference to an identical numerical aperture of a glass fiber. Examiner maintains that Ullmann et al. teach losslessly combining the light beams (see Col. 2, lines 53-59) and combining a light beam using an identical numerical aperture of a glass fiber ("0.2"- see Col. 6, lines 25-28). Hence, Claims 16 and 17 are made obvious under 35 U.S.C. 103(a) over Ullmann et al.

Regarding the 35 U.S.C. 103(a) rejection of Claims 19-22 over Suganuma, since Examiner maintains that Claim 18 is anticipated over Suganuma, the rejection of Claims 19-22 are also maintained.

Regarding the 35 U.S.C. 103(a) rejection of Claims 24, 27, and 28 over Suganuma, Applicant argues that Suganuma does not teach or suggest coupling the light from each partial beam into the laser light sources, or teach or suggest a plurality of beam combining means for largely losslessly combining the light emitted from the laser light sources with a reference to a characteristic property. Examiner maintains that Suganuma teaches coupling the light from each partial beam into the laser light sources, as seen in the usage of the polarization beam splitter prism (35) in Fig. 11, and that Suganuma also teaches a plurality of beam combining means (26a, 26b, 26c leading to 27a) for losslessly (see Col. 17, lines 46-49) combining the light. Hence, Claim 24 and dependent Claims 27 and 28 remain obvious under 35 U.S.C. 103(a) over Suganuma.

Regarding the 35 U.S.C. 103(a) rejection of Claims 25, 26, and 29 over Suganuma, Applicant argues that Suganuma does not teach or suggest a phase modification for combining light beams. Examiner maintains that it is well known in the art to use methods of constructive (combining matching-phase light beams) and destructive (combining opposing-phase light beams) interference to gain either a combined-intensity beam or a cancellation effect, respectively, and since Suganuma's invention combines the light beams to create a single, high-intensity beam, beams of similar wavelength and phase are used to provide the constructive interference effect. Hence, Claims 25 and 26 remain obvious under 35 U.S.C. 103(a) over Suganuma.

Regarding the 35 U.S.C. 103(a) rejection of Claims 30 and 31 over Kimura, Applicant argues that Kimura does not teach or suggest using two laser light sources having approximately the same wavelength, or losslessly combining these beams with reference to a characteristic property of the light beams. Examiner contends that a single light source branched into two light beams is functionally equivalent to two separate light sources each emitting a light beam and that indeed, the two light beams have the same wavelength as they originate from the same source. Furthermore, as previously stated, Examiner asserts that a polarization prism such as the one used in Kimura (see Kimura- Col. 8, lines 24-26) inherently possesses the properties of lossless combination, and once again, directs Applicant to Tokano et al. US Patent No. 5,850,140 for reference, who teach that a polarization prism is "advantageous in that optical energy loss is considerably suppressed" (see Tokano et al.- Col. 6, lines 25-29).

Regarding the 35 U.S.C. 103(a) rejection of Claims 32 and 33 over Kimura in view of Arimoto et al., Applicant argues that Kimura and Arimoto et al. do not teach or suggest using a

Glan-Thompson prism. Examiner contends that Applicant claims his invention with a polarization beam splitter, preferably a Glan-Thompson prism" implying that although a Glan-Thompson prism may be ideal, any polarization beam splitter still has sufficient properties to operate the invention. Hence, Examiner maintains that Claims 32 and 33 remain obvious under 35 U.S.C. 103(a) over Kimura in view of Arimoto et al.

Regarding the 35 U.S.C. 103(a) rejection of Claim 34 over Kimura in view of Arimoto et al., Applicant argues that Arimoto does not deflect the light from one laser source and pass light from another laser source as disclosed in Claim 34. Examiner maintains Arimoto indeed teaches the first light beam (S-polarized) deflected by the polarization prism while the second light beam (P-polarized) passes through the polarization prism (see Col. 1, lines 32-47). Hence, Examiner maintains that Claim 34 remains obvious under 35 U.S.C. 103(a) over Kimura in view of Arimoto et al.

Regarding the 35 U.S.C. 103(a) rejection of Claims 35 and 36 over Kimura in view of Arimoto et al., since Examiner maintains that Claim 30 is obvious over Kimura in view of Arimoto et al., the rejection of Claims 35 and 36 is also maintained.

Regarding the 35 U.S.C. 103(a) rejection of Claims 37-41 over Kimura in view of Saganuma, since Examiner maintains that Claim 30 is obvious over Kimura in view of Saganuma, the rejection of Claims 37-41 is also maintained.

17. Regarding Claim 3, although the above rejection is based upon the broad limitation of "polarization beam splitter", Examiner contends that using a Glan-Thompson prism is well known in the art and obvious over Arimoto et al., and cites Okazaki US Patent No. 5,701,201 for

reference, who teaches (see Fig. 2) a polarization beam splitter (225) to combine two light beams (through 223 and 226) implemented by a Glan-Thompson prism (see Col. 17, lines 26-28). Hence, even with the correction of the claim language for the 35 U.S.C. 112 2nd paragraph rejection, the limitations of Claim 3 are obvious over prior art.

Conclusion

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Yam whose telephone number is (703)306-3441. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (703)308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7724 for regular communications and (703)308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

SY
December 16, 2002

DAVID PORTA
SUPERVISORY PATENT EXAMINER
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